What is claimed is:

1. A dimensionally stable polymer balloon having a longitudinal axis and composed of a micro-composite material, the micro-composite material comprising a polymer matrix component and a polymer fibril component distributed in the polymer matrix component, the fibril component having micro-fibers oriented substantially parallel or diagonally to the longitudinal axis of the balloon.

2. The dimensionally stable balloon of claim 1 mounted on a catheter.

3. The dimensionally stable balloon of claim 1, wherein said fibril component comprises about 20% by weight or less but greater than about 0.1% of said micro-composite material.

4. The dimensionally stable balloon of claim 1, wherein the micro-composite material further comprises a compatibilizer component.

5. The dimensionally stable balloon of claim 4 wherein said compatibilizer is a block copolymer

6. The dimensionally stable balloon of claim 1, wherein the fibril component is composed of rigid-rod thermoplastic material.

7. The dimensionally stable balloon of claim 1, wherein the fibril component is composed of semi-rigid-rod thermoplastic material.

8. The dimensionally stable balloon of claim 1, wherein the fibril component is composed of liquid crystal polymer material.

9. The dimensionally stable balloon of claim 1, wherein the matrix component is a semi-compliant thermoplastic polymer.

10. The dimensionally stable balloon of claim 1, wherein the micro-fibers are oriented substantially parallel to the longitudinal axis of the balloon.

11. The dimensionally stable balloon of claim 1, wherein the micro-fibers are oriented diagonally to the longitudinal axis of the balloon.

12. The dimensionally stable balloon of claim 1, wherein the orientation of the micro-fibers relative to the longitudinal axis of the balloon changes through the balloon material in a direction transverse to said longitudinal axis.

13. A method of forming a balloon composed of a micro-composite material

comprising the steps of:

(a) melt blending a matrix component and a fibril component, wherein the mixture comprises less than about 15 percent by weight but greater than about 0.5 percent by weight of said fibril component, and the matrix component comprises less than about 99.5 percent by weight but greater than about 85 percent by weight of said matrix component;

(b) forming the melt blended mixture into tubing by extrusion in a manner which orients the fibril component along the longitudinal axis of the tubing; and

(c) forming the balloon by radial expansion of a segment of the tubing.

14. The method of claim 13 further comprising adding a compatibilizer to the melt blended mixture.

15. An inflatable medical balloon having a determined pre-inflation length, restricted longitudinal or radial expansion characteristics, a circumference and a longitudinal axis comprising:

a matrix material, said matrix material characterized as being semi-compliant;

and having a plurality of cores therethrough, said cores being evenly distributed about the circumference of the balloon and being composed of one or more materials which are characterized as being stronger than the matrix material and having a bulk elongation less than the matrix material when the one or more materials are oriented in the direction of the longitudinal axis, and the matrix material and the core material operatively adhering to one another.

16. The medical balloon of claim 15 wherein the bulk elongation of the one or more cores material is between 50% and 150%.